

Revisiting the Issues of Rate Base and Rate of Return in Cable Regulation

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Introduction

This paper discusses the FCC's Report and Order and Further Notice of Proposed Rulemaking, released March 30, 1994, (Report) as it relates to two core aspects of cost of service regulation: the appropriate measure of the rate base and the appropriate rate of return.

Competitive Market Value and the Rate Base

The economically sound value for the rate base is its competitive market value: the market value of the assets that would obtain if the system were facing competition. The Commission has stated, however:

While it might be possible to develop a different valuation approach, including one of the various approaches suggested by cable operators, we perceive no reason to believe that any one of those methods would better carry out the purposes of the Cable Act. Approaches based on market value at the time of acquisition are likely to include expectations of supra-competitive profits that would be difficult to disentangle from other aspects of market valuation, such as the expectations at the time of the growth and profitability of the unregulated services. We also believe that the commenters favoring market valuation methods understate the practical difficulty of applying sale prices of some systems or trends in stock prices to setting a market price for other systems. Certainly these methods are more complex than use of original cost, even if they could be developed into a reliable valuation method that excludes supra-competitive earnings and non-regulated activities. To the extent that acquisitions occurred at different times in the past, those expectations are also likely to have varied, and use of the full acquisition price is thus likely to produce uneven and unreliable valuations. . . . An attempt to apply a market value test as of the date of the adoption of the Cable Act in 1992 or at some later date presents similar problems of circularity, assessment of

investor expectations, and allocations to regulated services.
(Report, paragraphs 60-61, footnotes deleted.)

The Report does not address in any further detail the competitive-market-value approach.

The Commission acknowledges implicitly the theoretical correctness of the competitive market value approach. Its main stated concern is that the approach is impractical, that there is no operational way to measure a competitive market value. This concern is demonstrably wrong. Devising a competitive market value formula is simple and straightforward. This paper suggests a method for computing competitive market value that is not circular, inconsistent, or difficult to apply to regulated services. This method uses the Commission's own determination of the level of "monopoly mark-up" in the industry; it must therefore be seen by the Commission as completely purging any and all monopoly rents. Furthermore, this method is likely to be far easier to administer than an original cost approach.¹

Given the Commission's findings so far, determining the competitive market value of a cable system is straightforward. The Commission has found that, due to the market power of "non-competitive" systems, revenue per subscriber in service categories now to be regulated is 17 percent too high. The Commission could easily compute a competitive cash flow based on that 17 percent adjustment. The only other step in arriving at competitive market value is to take that competitive cash flow and apply to it the historical cash-flow-to-market-value multiple in the cable industry.

Specifically, given the Commission's finding, competitive cash flow would be pre-regulation cash flow minus 17 percent of revenue in service categories that are now to be regulated.² This value for competitive cash flow assumes that the number of subscribers, other revenue, and costs do not

¹ For a discussion of the administrative difficulty of applying the original cost approach to the cable industry see the Reply Comments of the National Cable Television Association, September 14, 1993. Also, applying the Commission's level of monopoly mark-up in our procedure is not an endorsement of that determination.

² A formal derivation of the value for competitive cash flow is contained in the Appendix.

change with the decline in prices. To compute the competitive cash flow for any given system, under these assumptions, the Commission would need only that system's pre-regulation values for cash flow and revenue in service categories that are to be regulated. Since all of the information required is historical and based on well-defined accounting concepts, such information would be easy to acquire. The Commission might want to use average figures for, say, the three calendar years prior to the enactment of the 1992 Cable Act.

To determine competitive market value, the Commission would then need to apply an appropriate multiple to the value of competitive cash flow. Table One contains information on cable industry acquisitions in 1989, 1990, and 1991.³ As that table shows, the average value of a system acquired in that period was 12.4 times the cash flow generated. To compute the competitive market value of a system, the Commission would simply multiply that system's competitive cash flow by 12.4.

For purposes of illustration, industry-wide figures can be used to compute an industry-wide ratio of competitive cash flow to pre-regulation cash flow. During the same three years used to compute the 12.4 multiple, industry-wide cash flow averaged \$7,817 million and industry-wide revenue from basic services (including expanded basic and installation revenue) averaged \$10,812 million. (The figures on revenue and cash flow are contained in Table Two.) Using these values for cash flow and revenue and applying the procedure described above, it is easy to show that for the entire industry competitive cash flow equals 76.5 percent of pre-regulation cash flow.⁴ Using the acquisition multiple of 12.4, competitive market value would equal $(12.4 \times .765 =) 9.5$ times the pre-regulation cash flow. These industry-wide numbers are used only for illustration, and it would be straightforward to apply this approach to any individual cable system. Again, all that is needed are the individual system's 1989-1991 figures for cash flow and for

³ The data used here are published in "The Cable TV Financial Data Book," Kagan Associates, June 1993. The Commission has the means to review and correct errors, if any, in these data.

⁴ This result is derived using the formulas in the Appendix and the figures in Table Two. $.765 = (7,817 - (.17 \times 10,812)) / 7,817$.

revenue in categories that are now to be regulated. Only the 12.4 multiple would be applied to all systems.

The Appropriate Rate of Return

On the issue of the appropriate rate of return, the Commission has determined that it will apply an industry-wide cost of capital of 11.25 percent. Much of the Commission's approach, described in paragraphs 147-208 and Attachment D of the Report, is antithetical to an economically sound determination of the cost of capital. The Commission begins by acknowledging that the rate of return should be calculated using a weighted average of the equity and debt costs:

We conclude that we should use the weighted average cost of capital method, with its cost of equity, cost of debt, and capital structure components. (Report, paragraph 164.)

The Commission summarizes its approach in a table showing equity costs ranging from 12 percent to 15 percent; debt as a fraction of firm value ranging from 40 percent to 70 percent; and a debt cost of 8.5 percent. (See Report, paragraph 205.) The Commission declines to use the standard, economically sound approach for computing the cost of capital. The result is that the Commission systematically understates both the cost of debt and the cost of equity to the cable industry. Using data for seven publicly traded cable companies, we show that the standard approach for computing the cost of capital generates a substantially higher number than that determined by the Commission.

Table Three shows the computation of the cost of capital for seven publicly traded cable companies. The conventional procedure used to compute the cost of capital is based on widely accepted economic principles.⁵ The table contains data that would be most relevant for the year 1993, as all figures are end-of-year 1992. The average cost of capital is 13.76 percent.

⁵ The procedure is described in virtually every textbook on corporate finance or firm valuation. See, for example, R. Brealy and S. Myers, *Principles of Corporate Finance*, Fourth Edition, 1991.

These data suggest that the Commission's 11.25 percent is more than 250 basis points less than a reasonable figure.

The Commission's approach differs markedly from the approach presented in Table 3. The cost of equity is determined by the historical returns to the overall stock market over and above the returns to a riskless asset (the risk premium) and the historical covariance of the firm's equity returns with those overall market returns (the beta). The Commission accurately describes the standard procedure in Attachment D:

Risk premium analysis. Risk premium analyses estimate the cost of equity by adding a risk premium to the yield on alternative relatively risk-free investments such as bonds. The risk premium is usually based on a comparison of historic realized returns on stocks and bonds. The current yield on a bond provides an easily determined reference point for current investor expectations on inflation and the general state of the economy.

The parties submitting risk premium analyses relied upon the CAPM variant of this methodology. CAPM uses a general risk premium, based on the differences in return on a risk-free investment and a diversified portfolio of risk-bearing investments, and adjusts it for the target stock's variance in return relative to that of a diversified portfolio. This adjustment is performed through the following formula:

$$\text{COE} = \text{RF} + (\text{beta} * \text{RP}),$$

where COE is the cost of equity estimate, RF is the current yield on risk-free investment, RP is the risk premium that compensates for the difference in the risk of a diversified, risk-bearing portfolio and a risk-free investment, and beta is a measure of a stock's unavoidable variance in return (i.e., non-diversifiable risk).

The CAPM is based on the widely accepted tenet of finance theory that investors require compensation only for risk (that is, variance in return) that cannot be avoided by holding a diversified investment portfolio. This risk (beta) is often estimated by comparing past variations in the return on the stock and on the stock market overall. . . .

In a previous proceeding we recognized CAPM's potential as a methodology for estimating the cost of capital. However, we found problems in that proceeding -- unrealistic risk premiums and betas -- that precluded our acceptance of CAPM analyses at that time. (Report, Attachment D, Paragraphs 2-5, footnotes deleted.)

The Commission's reasons for dismissing the CAPM approach can be found in paragraph 176 and in Attachment D. The Commission argues that:

As we note in Attachment D, the high betas of some cable equity issues reflect the closely-held nature of the stock. We believe that the historic pattern of fluctuations in cable stock prices is not purely the outcome of the changing risk-and-return assessments of market investors, but instead reflects in large measure insider decisions regarding cable stocks. Even if cable betas were purely a reflection of the changes in investor evaluations of the risks and return from cable services, we would still have to adjust for the monopoly profit component of investor expectations. We believe that the monopoly profit component was by far the most variable element in investor expectations. We, therefore, given no weight to this source of evidence about the risks of the cable industry. (Report, paragraph 176.)

By ignoring the covariance (the beta) in its approach, the Commission does not account for the relative risk of the cable industry.

The Commission's criticisms of the standard approach are for the most part irrelevant. There is no reason to think that the covariance of cable stocks with the overall market would be related to monopoly profits. Insider holdings is also irrelevant in this context. To the extent that the covariance can be measured, it ought to be taken into account. If the Commission wants to dismiss the ability to measure a true beta, it could take the approach that cable industry cost of equity is the historical return to *small company stocks*. The returns to small company stocks more closely reflect the equity costs of the average cable system than does the return to the S&P 400 relied upon by the Commission. An approach based on small company stocks would generate a cost of equity of 17.6 percent, and a cost of capital of 13.5 percent, both substantially greater than those determined by the Commission.⁶

There is much less equity than debt in the typical cable system, however. For the firms analyzed in Table Three, equity is on average about 35 percent of total value. Most of the actual difference between the Commission's calculation and the one presented here, therefore, comes from the cost of debt side of the equation. The Commission's assumption of debt

⁶ The historical return for small company stocks is from SBBI 1994 Yearbook, Ibbotson Associates.

cost of 8.5 percent is simply mistaken. The Commission's discussion, found in paragraphs 184-190 of the Report, displays confusion between short-term working capital costs and long-term debt costs. The Commission's discussion also displays confusion between yield and interest payments. By the Commission's reasoning, if cable firms issued zero-coupon bonds (bonds that have no periodic interest payment), the cost of debt would be zero. Our sample in Table Three uses the actual yield for the end of 1992 on B-rated bonds, the most common rating for these firms. The Commission need not speculate on this point. Information on the yield of various grades of debt is widely available. As it did with the cost of equity, the Commission underestimates the cost of debt to the cable industry.

The approach to measuring the cost of capital presented here is not only economically sound, it is also likely to be conservative given the sample of firms and the nature of the regulations being imposed. The seven firms in the sample are generally larger and, because they are publicly traded, are likely to have easier access to capital markets than the average cable system. For these reasons, they probably have capital costs substantially lower than the average cable system. In addition, the Commission ought to realize that the regulations it is enforcing will increase the cost of capital for all systems. That is, the reductions in cash flow and increases in risk of bankruptcy engendered by the new regulations are likely to increase substantially the cost of capital for cable systems.

Appendix: A Simple Method for Computing Competitive Cash Flow

It is easy to show that only two pieces of system-specific information are needed to calculate competitive market value: pre-regulation cash flow and pre-regulation revenue in service categories that are now to be regulated. As noted, in order to determine competitive market value, competitive cash flow must first be calculated. Cash flow can be disaggregated into its components as follows:

$$1) \quad CF = RR + OR - C,$$

where CF is cash flow, RR is revenue from regulated services, OR is all other or unregulated revenue, and C represents all costs relevant to cash flow. (In the cable industry, the term "cash flow" generally refers to earnings before interest, taxes, depreciation, and amortization.) Next, use the Commission's finding that, due to the market power of "non-competitive" systems, regulated revenue (per subscriber) is 17 percent too high. Hence, according to the Commission, competitive cash flow (CCF) would be:

$$2) \quad CCF = .83 RR + OR - C.$$

Since $OR - C$ is equal to $CF - RR$ (from the first equation), it is not necessary to determine values for OR or for C. Instead, we can substitute $CF - RR$ for $OR - C$ in equation (2):

$$3) \quad CCF = .83 RR + CF - RR.$$

Rearranging the terms gives us the simplest form of the value for competitive cash flow:

$$4) \quad CCF = CF - .17 RR.$$

This derivation assumes that the number of subscribers, other revenue, and costs do not change with the decline in prices. Equation 4 shows that to compute the competitive cash flow for any given system, under these assumptions, the Commission would need only that system's pre-regulation values for cash flow and revenue in service categories that are to be regulated.

Table One
Cable Acquisition Multiples, 1989-1991.

Seller	Buyer	Date Agreed	Subs (000)	Price (mil.)	Multiple of Cash Flow
C.A.T. Partnership	UA Cable/swap	1/89	74	193	12.9
Warner Communications	Time Inc.	3/89	1,583	3,633	12.8
Centel Corp.	Consortium	3/89	588	1,431	13.9
Centel/IL	Jones Intercable	3/89	125	340	14.2
Centel/So. FL	Adelphia Communications	3/89	130	310	13.0
Centel/Central FL	American TV & Communications	3/89	97	251	15.3
Centel/OH	Warner Cable	3/89	74	211	15.9
Centel/MI	C-Tech	3/89	102	210	13.3
Hauser/Minneapolis, MN	King VideoCable	3/89	46	131	13.0
Centel/KY & IN	Simmons Communications	3/89	60	110	12.0
Group W/Chicago, IL	Prime Cable	4/89	115	213	14.5
Times Mirror/MA & NY swap	Cablevision/ AZ	5/89	100	295	14.2
Republic Cable	Cablevision Systems	5/89	47	148	13.9
Valley Cable/CT	Tele-Media	5/89	40	90	11.3
Tele-Media/OH	Warner Cable	5/89	31	70	14.1
American/Pompano Beach, FL	Continental Cable	6/89	115	242	12.6
American/Cambridge, MA	Continental Cable	6/89	55	104	10.9
American/Midwest	Continental Cabel	6/89	44	86	11.0
American/IL	Continental Cable	6/89	41	78	11.8
Better Ent. L.P. I	Adelphia Communications	6/89	30	68	11.7
Cooke Media	Consortium	7/89	674	1,548	12.4
Cooke Cable	Tele-Communications, Inc.	7/89	210	398	12.8
Choice Cable TV	Cencom Cable Associates	7/89	138	377	13.1
Cooke Cable	Rigas Family	7/89	80	193	12.5
Cooke Cable	TCA Cable	7/89	90	183	11.6
Cooke Cable	Falcon Commuunications	7/89	47	96	10.8
Cooke/Chico, CA	Chambers Communications	7/89	29	63	11.3
Jones 11-B	Adelphia Communications	8/89	33	81	14.0
Joseph Gans	Adelphia Communications	8/89	31	69	14.4
Jones 10-C	Cablevision Industries	8/89	22	53	12.8
Heritage/Dallas, TX	Tele-Communications, Inc.	9/89	105	304	13.9
Comcast Investors	Comcast Corp.	9/89	53	113	15.0
Jones 11/A-F	Crown Cable	10/89	136	265	13.2
First Carolina	Falcon Communications	10/89	92	185	11.2
Tele-Media/OH, KY	Vista Communications	10/89	28	56	14.9
Adelphia Communications	Olympus L.P.	12/89	54	181	14.8
Star Cable	Marcus	1/90	61	118	10.4
Colonial Cable	Continental Cable	1/90	20	61	12.9
Ingersoll Industries	Warner Communications	1/90	22	52	13.9
Insight Communications	Cencom Cable Associates	3/90	72	165	11.6
ML Media	InterMedia	6/90	42	85	12.0
Jones/Flossmore, IL	Jones Fund I5-A	6/90	23	71	13.4
Daniels/CA & LA	United Cable	2/91	39	76	10.5
Karnack Corp.	Tele-Communications, Inc.	2/91	45	53	8.7
King VideoCable	Colony/ Keslo	3/91	210	340	10.0
Star Cable Group	InterMedia	7/91	110	165	8.2
Gilbert/Newark, NJ	Cablevision Systems	10/91	42	78	8.9
MN & ND	New Heritage	11/91	78	182	11.0
Simmons/Long Beach, CA	Cablevision Industries/KKR	12/91	66	133	9.3
Cox/NY swap	Time Warner/ FL Swap	12/91	60	125	8.2

Average: 12.4

Note: List of 100% acquisitions with no debt assumption.

Source: The Cable TV Financial Databook, Kagan Associates, June 1993, pages 131-135.

Table Two
Cable Revenue, 1989-1991

Year	Basic Revenue	Install Revenue	Expanded Basic	Total Basic Revenue	Total Revenue	Cash Flow
1989	8,670	213	267	9,150	15,678	6,900
1990	10,169	239	495	10,903	17,855	7,800
1991	11,414	262	706	12,382	19,743	8,750
			Average	10,812	17,759	7,817

Note: Figures are in millions.

Source: *The Cable TV Financial Databook*, Kagan Associates, June 1993, pages 8, 86.

Table Three
Cost of Capital: Representative Publicly Traded Cable Companies, 1993

Cable Companies	1	2	3	4	5	6	7	8
	Debt d	Equity e	Cost of Debt Rd	Beta B	Risk Free Rate Rf	Equity Risk Premium Rp	Cost of Equity Re	Cost of Capital Rc
Adelphia	1,554	218	11.24	1.76	5.27	8.60	20.41	12.37
Cablevision Systems	1,914	796	11.24	1.70	5.27	8.60	19.89	13.78
Century Communications	1,175	697	11.24	2.05	5.27	8.60	22.90	15.58
Comcast	3,974	2,632	11.24	1.57	5.27	8.60	18.77	14.24
Jones Intercable	299	177	11.24	1.80	5.27	8.60	20.75	14.78
Jones Spacelink	364	70	11.24	2.17	5.27	8.60	23.93	13.29
TCA Cable	130	528	11.24	0.85	5.27	8.60	12.58	12.32
Cable Company Average	1,344	731	11.24	1.70	5.27	8.60	19.89	13.76

Sources:

- 1) Long term debt from Kagan, end of year 1992, millions.
- 2) Equity from Kagan, end of year 1992, market value, millions.
- 3) Cost of debt from S&P Bond Guide, B Rated Industrial Bond Yields, December 1992.
- 4) Beta from S&P Compustat, end of year 1992.
- 5) Risk free rate from S&P Bond Guide, short term government bond yields, December 1992.
- 6) Risk Premium = Difference between returns, stocks v. short term government bonds, arithmetic means, from SBBI 1994 Yearbook, Ibbotson Associates.
- 7) Cost of Equity, $Re = Rf + B(Rp)$
- 8) Cost of Capital, $Rc = Re(e/(d+e)) + Rd(d/(d+e))$.

ATTACHMENT F

"Prices Above Book Values Do Not Imply Market Power"

**Economists Incorporated
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**(originally submitted as Appendix A to
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APPENDIX A

Prices Above Book Values Do Not Imply Market Power

I. Introduction

The Commission has tentatively decided to “adopt an original cost methodology to determine the value of a cable operator’s plant in service for rate base purposes,” and to exclude “excess acquisition costs from rate base, including portions assigned to goodwill, customer lists, franchise rights, and other intangible assets.”¹ This decision seems to be based on the view that any acquisition value above original cost is an indication of monopoly rents and, therefore, should not be included in the rate base.

This paper presents evidence to the contrary. We analyze the reasons why the market value of assets would be expected to exceed book value whether an industry is competitive or not. We examine the average annual market-to-book equity ratios for S&P 500 firms from 1977 to 1992, showing that the average ratio always exceeds one.

Finally, we examine the harm that will be caused if the Commission adopts an original cost rate base, or any other rate base that does not reflect the value of intangible assets. An insufficient rate base will cause under-investment in the future and will encourage degradation of existing assets, to the detriment of consumers.

II. Market prices differ from book values for a variety of reasons

A firm’s assets are commonly categorized as tangible or intangible. Physical capital is a tangible asset; the remaining value of the firm constitutes intangible assets. Intangible assets can comprise a large and vital part of a firm’s investment. Intangible assets have been defined as the

¹ FCC, “Notice of Proposed Rulemaking,” MM Docket No. 93-215, July 15, 1993, paragraph 35.

long-lived legal rights and competitive advantages that are developed or acquired by a business.² In this paper, we decompose intangible assets into those two components; referring to long-lived legal rights as organizational capital and competitive advantages as economic rents.

A firm's market value is the present discounted value of the income expected to be generated by the assets of the firm in the future. A firm's book value is the depreciated value of what past and present investors have put into the firm, as measured by accounting standards. A firm's market value will diverge from its book value for several reasons, including:

- (1) inflation,
- (2) divergence between real and accounting rates of depreciation,
- (3) organizational capital,³
- (4) quasi-rents,
- (5) monopoly rents.

Most of these factors cause the market value of any viable firm to exceed its book value. The first two factors are reasons why market value may differ from book value even in the absence of intangible assets. The next three factors represent intangible assets. These intangible assets, and other factors, can affect the market value of a firm while leaving its book value unaffected. For example, the rate at which expected income is discounted could change for reasons of time preference or risk. Expected income before discounting can also change due to changes in any of the above listed factors. We discuss each of these factors in turn.

² This definition is from Williams, Jan R. and Martin A. Miller, *GAAP Guide 1993*, Harcourt, Brace, Jovanovich, New York, 1993, p. 21.01.

³ The term "organizational capital" comes from Cornell, B. and A. Shapiro, "Corporate Stakeholders and Corporate Finance," *Financial Management*, Spring 1987, pp. 5-14. The bulk of a firm's intangible assets will take the form of organizational capital.

Inflation following the original investment causes the investment's dollar price to rise merely because the price is stated in dollars that are worth less than before. Hence, the original cost method usually underestimates the true value of a firm's tangible assets, because it values those assets at the time of purchase, which might have been many years in the past.

The book value of assets equals their original cost minus accounting depreciation. There is no reason to expect real, economic depreciation to equal accounting depreciation. Accounting depreciation usually follows a schedule specified by the tax code. Economic depreciation, which market value reflects, depends on changes in the actual usefulness of the asset. A divergence between economic and accounting depreciation will be reflected in a divergence between the market and book value of the assets.

Organizational capital refers to a firm's non-physical assets created by its employees and managers. Organizational capital includes all of the business relationships of a firm, that is, the myriad of implicit and explicit contracts with managers, employees, suppliers, and customers. Organizational capital also includes the value of the information embedded in a firm's operating procedures; the value of its brand name and reputation; and the value of its supply and distribution networks. Organizational capital is not derived from monopoly power and it does not disappear in a competitive environment.

Economic rents include both quasi-rents and monopoly or locational rents. Economic rents are payments to factors of production in excess of the amount necessary to secure the services of those factors. Economic rents are an important source of information in an economy. They signal the potential for above-normal profits and thus induce entry and increased investment. Absent some "barrier," entry and increased investment will eventually reduce profits to their normal levels, and the

existence of above normal profits directs resources to their highest valued use.⁴

Quasi-rents refer to rents that exist only temporarily, until they are competed away. Quasi-rents can be earned by a firm on its physical assets and on its organizational capital. Quasi-rents can arise from the foresight or luck to have invested in the right assets at the right time. For example, a new technology might make existing assets more valuable. With regard to the cable industry, for example, the revenue potential from digital compression foreseeable today may not have been foreseen in the past.

Monopoly or locational rents are due to market power. Unlike quasi-rents, monopoly rents do not dissipate in a competitive environment. While these rents also serve as a signal, some "barrier" impedes entry and the rents persist.

III. Economy wide market-to-book ratios

In general, there is no reason to expect the accounting or book value of assets to approximate the market value of those assets. This fact was brought home with great clarity in the savings and loan crisis, which resulted in part from the practice of bank regulators mistaking the book value of mortgages held as assets by thrifts for their market value, which had declined disastrously.

Even in the absence of market power, inflation, accelerated depreciation schedules and organizational capital will often cause the market value of an ordinary firm's assets to exceed its book value.⁵ In particular, the value of a firm's assets in an acquisition will generally far exceed the book value of the assets.

⁴ On the general topics of rents, profits, and competitive returns, see Stigler, George, *The Theory of Price*, Fourth Edition, 1987, chapters 11 and 16; and McCloskey, Donald N., *The Applied Theory of Price*, Second Edition, 1985, chapter 14.

⁵ See the appendix to this paper for a more detailed discussion.

Table 1 shows the average equity market-to-book ratios from 1977 to 1992 for all firms in the S&P 500 index. The average ratio has always exceeded one; it equaled 2.65 in 1992. Because long-run monopoly rents cannot be ubiquitous for all the firms in the S&P 500, monopoly power cannot account for the excess of market value to book value. Furthermore, since the market value of U.S. firms generally exceeds their book value, it is unreasonable to attribute that excess to monopoly power for any industry, including the cable television industry.⁶

IV. Harm from adopting an original cost ratebase

The Commission's tentative conclusion to use the original cost of the plant in service as the rate base means that cable operators will earn returns only on tangible, accounting-based costs — on the depreciated book value of assets. That policy is supportable only if the entire difference between such costs and market value are monopoly rents. As the evidence above indicates, that cannot be the case.

The definition of rate base contemplated by the Commission will cause under-investment in the cable television industry in the future. There will be no incentive to invest in cable industry assets if only part of the market value of those assets are allowed to earn a competitive return.

If eliminating intangible assets from the rate base were viewed as a one-time tax on previously accumulated capital, a tax which is neither anticipated nor expected to be repeated, then the tax would not be distortionary. The investment already occurred and cannot be undone. Such taxes, however, do create distortions if investors worry that the

⁶ In a recent decision, the Commission discussed q , the ratio of a firm's market value to the replacement cost of its assets, rather than to its book value. The Commission noted a number of reasons why market value might exceed replacement cost in a competitive industry, including measurement errors dealing with intangibles and above average risk. All these reasons also could make market value exceed book value. "In the Matter of Competition, Rate Deregulation and the Commission's Policies Relating to the Provision of Cable Television Service," FCC 90-276, Adopted July 26, 1990, ¶59.

government will impose another such tax in the future.⁷ The possibility of another levy of this type increases investors' uncertainty about investment returns, leading them to apply a higher threshold rate of return to future investment projects. Therefore, projects that would have been undertaken will be foregone, hurting both cable operators and consumers.

There will be a deleterious effect of the Commission's proposal on existing cable industry assets as well. Once the rate base is defined to exclude or undervalue certain assets, it will reduce the incentive to repair and maintain those assets. Existing assets will be allowed to decay, and there also will be a diminished incentive to upgrade equipment in keeping with technological developments.

In sum, the incentives with regards to repairing, maintaining, and upgrading existing assets, and with regards to expanding the industry, will be perverse. Consumers will be harmed.

The use of original cost also could have serious financial consequences for the cable industry. Many cable systems changed hands in the late 1980s at prices far in excess of the book value of the assets acquired. The difference between the seller's book value and the acquirer's price was allocated in varying proportions to a write-up of tangible asset value, to amortizable franchise and subscriber list values, and to goodwill. If the Commission proposes to exclude all of this from the rate base, it will deprive these systems of a large part of their asset values that is not attributable to monopoly rents. The practical result may be that some systems' earnings fall by so much that they will be unable to service their debt.

This problem is not limited to those systems that recently changed hands, it affects all systems. Systems that did not change hands nevertheless have a market value that in all probability exceeds book value.

⁷ See, Barro, Robert, "Retroactivity—Bungled Larceny," WSJ, Aug. 17, 1993, p. A14 for a discussion of taxes on prior behavior and their distortionary effects.

To use original cost to value such systems is to deprive them of property value that has no connection to monopoly profits.

V. Summary

The original cost method usually underestimates the true value of a firm's tangible assets, because it values those assets at the time of purchase, which might have been many years in the past. Replacement and reproduction cost methods attempt to correct this deficiency, but these methods share a second and potentially more serious problem with the original cost method; they omit intangible assets.

A cable system cannot effectively conduct its business without intangible assets, including customer goodwill, contracts, technical expertise, and a skilled management team. Original, reproduction, or replacement cost methods of valuing the ratebase ignore these important assets. Denying cable operators the value of their investments in intangible assets would effectively constitute the confiscation of that investment.

If the Commission shows itself willing to confiscate the value of past investments, it will be expected to do so again. Hence, if the Commission does not allow the rate base to reflect the value of all assets, tangible and intangible, there will be an under investment in maintaining existing assets and investing in new assets. The growth of the cable industry will likely be substantially impeded, making both cable owners and consumers worse off.

Appendix⁸

Consider the market-to-book ratio, MTB , as usually defined wherein the market value, M , may differ from its tangible-asset book value, B . In this case let $B = T$, tangible assets, and

$$MTB = \frac{M}{T}. \quad (1)$$

Consider alternatively, an accurate-accounting market-to-book ratio, MTB^* , wherein the true book value, B^* , is adjusted to account for inflation, I ; organizational capital, OC ; other factors, OF , such as quasi-rents, and the divergence between accounting and economic depreciation; and monopoly rents, R . For the accurate-accounting case, $B^* = T + I + OC + OF + R$, and

$$MTB^* = \frac{M}{T + I + OC + OF + R}. \quad (2)$$

Combining Equations (1) and (2) to find the ratio of MTB to MTB^* , yields

$$\frac{MTB}{MTB^*} = 1 + \frac{I}{T} + \frac{OC}{T} + \frac{OF}{T} + \frac{R}{T}. \quad (3)$$

Because Equation (2) includes an adjustment to B^* to account for the factors that cause B to differ from M in Equation (1), $M = T + I + OC + OF + R$ and $MTB^* = 1$. Thus Equation (3) can be rewritten as

$$MTB = 1 + \frac{I}{T} + \frac{OC}{T} + \frac{OF}{T} + \frac{R}{T}. \quad (3')$$

Equation (3') shows how to account for the components of value other than tangible assets. Each component's contribution to the market-to-book

⁸ The analysis here extends McFarland, Henry, "Evaluating q as an Alternative to the Rate of Return in Measuring Profitability," *Review of Economics and Statistics*, 1988, 614-622.

ratio's difference from one is the ratio of that value to tangible asset value. An example will show the simplicity of the concept.

Consider a firm that invested in plant in service for \$10. Since the original investment, another firm acquired the plant for \$18 for an ostensible market-to-book ratio of 1.8. If, in the time following the original investment, inflation added \$1 in (current dollar) value, organizational capital added \$5, other factors added \$1, and monopoly rent added \$1, then the entire market to book ratio can be accounted for by Equation (3').

$$1.8 = 1 + \frac{1}{10} + \frac{5}{10} + \frac{1}{10} + \frac{1}{10}$$

Knowing any three of the additional components allows the fourth to be inferred, because market value and tangible asset value are known.

Table 1
Market to Book Ratios for the S&P 500

<u>Year</u>	<u>Market/Book Ratio</u>
1977	1.20
1978	1.13
1979	1.15
1980	1.32
1981	1.12
1982	1.25
1983	1.41
1984	1.37
1985	1.69
1986	1.91
1987	1.84
1988	1.97
1989	2.40
1990	2.16
1991	2.59
1992	2.65

Source: Merrill Lynch

ATTACHMENT G

"The Equity Cost of Capital for Cable Operators is High and Variable"

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**(originally submitted as Appendix B to
NCTA Comments in MM Docket No. 93-215)**

APPENDIX B

The Equity Cost of Capital for Cable Operators is High and Variable

I. Introduction

The equity cost of capital paid by six large cable operators is significantly higher than that paid by AT&T, GTE, and the Regional Bell Operating Companies. Moreover, among the cable operators examined here, there are considerable differences in the cost of their equity capital. These results suggest that cable operators should be allowed a rate of return on equity that exceeds the rate allowed for regulated telephone companies, and that setting a uniform rate of return for all cable operators is inappropriate.

The present results are based on an empirical analysis of the six cable operators whose stock price data readily accommodate risk premium analysis. The six companies do not constitute a representative sample. The results, however, do have implications for other cable operators and for other funding sources. In fact, the cost of capital for small cable operators is likely to be higher than that for large operators. And a cable operator that must pay dearly for capital in equity markets is likely to have to pay dearly for capital in debt markets too.

This paper motivates the standard methodology for estimating a company's market risk, β , which is the key parameter for measuring its equity cost of capital. Estimates of β are presented and interpreted.

II. Measuring the cost of equity

In the Notice of Proposed Rulemaking, the Commission notes that there are two common methods of estimating the cost of equity: discounted cash flow analysis, and risk premium analysis.¹ Neither method can be

¹ FCC, "Notice of Proposed Rulemaking," MM Docket No. 93-215, July 15, 1993, paragraph 51, and footnote 55.

tractably applied to the vast majority of cable operators, and the discounted cash flow method poses problems for even the largest cable operators.² Risk premium analysis, however, can be applied to large cable operators and inferences can be drawn for the others.

The use of risk premium analysis to determine the equity cost of capital relies on the fact that the equity cost of capital is paid to investors as the total return they receive on a firm's equity.³ The return is higher for a risky investment than for a safe investment. A firm's cost of capital exceeds the rate earned on an investment that is "risk free" corresponding to its degree of risk. Portfolio theory guides the proper measurement of risk and its relation to return.

In standard portfolio theory, required return measurement begins with the return commensurate with a risk free instrument (such as a U.S. Treasury Bill) and adds the return commensurate with the risk of the firm in question. Portfolio theory presumes that investors are not compensated for risks they can avoid. Only unavoidable risks lead to higher returns.

The most commonly applied portfolio model is the Capital Asset Pricing Model (CAPM), which receives prominent treatment in any finance textbook. The CAPM distinguishes between avoidable risk and unavoidable risk through a statistical comparison of the relevant firm's equity returns to total market returns. Risk which is unique to the firm, and hence independent of the market, can be avoided through diversification. Only that component of risk which is related to the market is unavoidable. The unavoidable component of a firm's risk translates into a higher equity cost of capital for that firm.

The size of the unavoidable risk, or market risk, is measured by a coefficient referred to as β , which measures the extent to which changes in

² The discounted cash flow method relies on the presence of regular dividends as a means of disbursing earnings to shareholders, and on a past earnings record that facilitates extrapolation to the future. In general, cable operators do not possess these characteristics.

³ Returns are the percent change in price from period to period. Total return includes both dividends and capital gain.
